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[54] ZWITTERIONIC BISCYCLOPENTADIENYL COMPLEXES

[75] Inventors: Francis J. Timmers; David D. Devore, both of Midland, Mich.

[73] Assignee: The Dow Chemical Company, Midland, Mich.

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Related U.S. Application Data

[60] Division of Ser. No. 481,791, Jun. 7, 1995, which is a continuation-in-part of Ser. No. 284,925, Aug. 2, 1994, abandoned.

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[58] Field of Search 556/7, 11, 12, 556/28, 53

[56] References Cited

U.S. PATENT DOCUMENTS

3,242,099 3/1966 Manyik et al. 252/429
5,198,401 3/1993 Turner et al. 502/155
5,374,753 12/1994 Yamada et al. 556/11

OTHER PUBLICATIONS

Organometallics, "1,3-Diene Complexes of Zirconium and Hafnium Prepared by the Reaction of Enediylmagnesium with MCl_2Cp_2 ," Yasuda, et al, 1982, 1, pp. 388-396.

Acc. Chem. Res., "Unique Chemical Behavior and Bonding of Early-Transition-Metal-Diene Complexes" Yasuda, et al., 1985, 18, pp. 120-126.

Advances in Organometallic Chemistry, "The Remarkable Features of (η^5 -Conjugated Diene) Zirconocene and hafnocene Complexes" Erker, et al., 1985, vol. 24, pp. 1-39. Chem. Ber., "Seven-Membered Heterodimetallic Ring Systems from (Conjugated Diene) Group 4 Metallocene Complexes and Organoaluminum Reagents" Erker et al., 1994, 127, pp. 127, pp 805-811.

Organometallics, Spaleck et al., 1994, 13, pp. 954-963.

U.S. Ser. No. 08/082,197, filed Jun. 24, 1993 (C-41,350) (Devore et al.).

U.S. Ser. No. 08/230,051, filed Apr. 19, 1994 (C-41,350A) (Devore et al.).

U.S. Ser. No. 08/241,523, filed May 12, 1994 (C-41,350B) (Devore et al.).

Primary Examiner—Porfirio Nazario-Gonzales

[57] ABSTRACT

Zwitterionic biscyclopentadienyl, Group 4 transition metal complexes formed with conjugated dienes useful as catalysts for polymerizing olefins, diolefins and/or acetylenically unsaturated monomers.

3 Claims, No Drawings

Zwitterionisch ligandens Anion